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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,770	06/01/2001	Subhash Narang	A-70610/RFT/TJH	1227

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EXAMINER

RUTHKOSKY, MARK

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 07/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,770

Applicant(s)

NARANG ET AL.

Examiner

Mark Ruthkosky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 13-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11 and 12 is/are rejected.
- 7) ☒ Claim(s) 9 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/13/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement filed 9/13/2002 has been placed in the application file, and the information referred to therein has been considered as to the merits.

Drawings

The drawings filed on 6/1/2001 are approved.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Election/Restrictions

Applicant's election, with traverse, of claims 1-12 in the reply filed on 5/13/2004 is acknowledged. The applicant traverses the restriction of groups I-VI, which includes claims 1-23 (on page 7 of the response.) The traversal is on the ground(s) that membrane electrode assemblies, electrochemical devices, and fuel cells having polymer electrolyte membranes are well known in the art and that the novelty of the claims is in the polymer electrolyte membrane of claim 1. The applicant argues that as the polymer electrolyte membranes are not "membranes," that are readily utilizable alone or in other combinations. This is not found persuasive because these membranes are "membranes" and may be utilized, as claimed, in

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batteries and fuel cells. Further, these membranes may be used in electrolyzing instruments or ion pumps. In addition, the membrane may be used simply as a membrane for separating ions based on interactions with the acidic and basic subunits of the membrane.

Groups II-IV are considered patentably distinct. The applicant has submitted that the final products are obvious variants and that the novelty of the invention is in the polymer electrolyte membrane. This argument is not persuasive as the final products are not obvious variants because they include the membrane of claim 1. Fuel cells, batteries, electronic devices and electrode assemblies are not obvious variants simply because the final products all have the same membrane.

With regard to groups I, V and VI, it is noted that the process claims depend from the product claims. These process claims do not further limit the product. The process claims are patentably distinct from the product. The product can be made by another process as noted in the restriction. Further, the process is simply combining two or more polymers. This process may be used to prepare a rubber tire or a ball, for example. The method of forming a polymer electrolyte membrane is clearly different than a method of forming a membrane electrode assembly as both the process method steps and the products are different.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 5, 6 and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Fenton et al. (US 6,465,136.)

The instant claims are to a polymer electrolyte membrane comprising a first polymer comprising acidic subunits and a second polymer comprising basic subunits, wherein (i) at least one of the first or second polymers is an elastomeric copolymer further comprising an elastomeric subunit or (ii) the polymer membrane further comprises an elastomeric polymer comprising elastomeric subunits.

Fenton et al. (US 6,465,136) teaches a composite electrolyte membrane which includes a porous polymer matrix and an ionically conductive solid wherein the membrane includes compounds of polyvinylidene fluoride (PVDF, elastomer), sulfonated polyetheretherketone (acidic polymer) and polybenzimidazole (PBI, basic polymer.) The claims and specification teach that the composite membrane may include combinations and copolymers of these materials (claims and col. 4, lines 40-55.) Styrenes and methacrylates are also noted as composite materials, which are known in the art as elastomers. The membrane is used as an electrolyte in a fuel cell. Fuel cells transfer protons across the membrane. Further, the membrane of a fuel cell is substantially impermeable to methanol in order to react methanol at one of the fuel cell

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electrodes. Thus, the combination of the stated materials form a membrane as claimed and thus, the claims are anticipated.

Claims 1, 2, 4, 6, 7, 8 and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Wu et al. (US 6,214,251.)

Wu et al. (US 6,214,251) teaches a polymer electrolyte membrane comprising a matrix polymer containing a Lewis base and further comprising a promoter polymer. The matrix polymer includes an elastomeric polymer such as polyacrylonitrile (PAN) or PVDF (claim 8.) In addition the promoter polymer includes acids, such as polyacrylic acid (claim 4.) Aziridines and imines are noted (claim 8.) General amines are noted in column 6. The membrane is used as an electrolyte in a fuel cell (col. 1, lines 1-10.) Fuel cells transfer protons across the membrane. Further, the membrane of a fuel cell is substantially impermeable to methanol in order to react methanol at one of the fuel cell electrodes. Thus, the claims are anticipated.

Claims 1, 2, 4, 5, 6 and 11-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Narang et al. (US 6,248,480.)

Narang et al. (US 6,248,480) teaches a polymer electrolyte matrix comprising a polymeric backbone with an ion-exchange side groups of an acid (claim 1.) The polymer may be an elastomer such as polyurethane. The polymer electrolyte may include a basic polymer such as PBI (claim 16.) . The membrane is used as an electrolyte in a fuel cell (col. 1, lines 1-40.) Fuel cells transfer protons across the membrane. Further, the membrane of a fuel cell is substantially impermeable to methanol in order to react methanol at one of the fuel cell electrodes. Thus, the claims are anticipated.

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Claims 1, 2, 4, 6, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Tagoshi et al. (EP 900,834.)

Tagoshi et al. (EP 900,834) teaches an elastomer electrolyte membrane including an electrolyte salt. The material includes a cross-linked acid-base copolymer material mixed with an elastomer and a urethane. The monomers of the acid base copolymer include both acid and base materials (page 3 and paragraph 22.) Sulfonic acids are noted, for example. Polyurethane is a basic material with an amine group and it is also an elastomer. Elastomers, including polyacrylonitrile copolymers, are noted in paragraph 34. Thus, the claims are anticipated.

Allowable Subject Matter

Claims 9-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The instant claims are to (i) a polymer electrolyte membrane including a mixture of a specific acid polymer of sulfonated PEEK and an elastomeric copolymer with basic subunits of vinylimidazole and elastomeric subunits including acrylonitrile; and (ii) a polymer electrolyte membrane including a basic polymer of polyvinylimidazole and an elastomeric polymer with acidic subunits comprising 2-acrylonamide-2-methyl-1-propane sulfonic acid and elastomeric subunits including acrylonitrile. The prior art does not teach a polymer electrolyte membrane including these materials, as claimed. As such, these claims are allowable over the prior art.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky
Primary Patent Examiner
Art Unit 1745

Mark Ruthkosky
7/17/04